WHAT IS CLAIMED IS:

1. An apparatus for preparing an array of chemical compounds on the surface of a support, said apparatus comprising two elements that are in a sealed, movable relationship relative to one another and that form a chamber having a controllable interior environment for preparing said array of chemical compounds.

2. An apparatus according to Claim 1 wherein said two elements are a top element and a bottom element and wherein one of said elements comprises a mechanism for introducing a gas into a gap between said top element and said bottom element to form a movable aerodynamic seal between said top element and said bottom element.

3. An apparatus according to Claim 2 wherein said mechanism is adapted to introduce said gas adjacent the perimeter of said top element and the perimeter of said bottom element.

4. An apparatus according to Claim 2 comprising a bottom wall and side walls wherein said mechanism for introducing a gas comprises openings in said side walls and a source of said gas.

5. An apparatus according to Claim 2 wherein said gas is introduced into at a pressure of about 20 to about 50 psi.

6. An apparatus according to Claim 2 wherein said top element has sealingly affixed therein at least a portion of a device for dispensing reagents.

7. An apparatus according to Claim 2 wherein said bottom element is adapted for introduction of a support therethrough and said support is releasably attached to a platform for moving said support relative to said dispensing device and said bottom element relative to said top element.

8. An apparatus according to Claim 7 wherein said platform comprises a theta stage moved by an x,y linear stage.

9. An apparatus according to Claim 2 comprising a gas inlet for introducing a second gas into the interior of said chamber and a gas outlet for exiting said second gas from said chamber.

10. An apparatus according to Claim 9 wherein the flow of said second gas through the interior of said chamber is substantially uniform.

11. An apparatus according to Claim 9 comprising a mechanism for dispersing said second gas within the interior of said chamber.

12. An apparatus according to Claim 11 wherein said mechanism comprises one or more gas inlets and a manifold comprising one or more compartments, each of said compartments being in fluid communication with a respective gas inlet.

13. An apparatus according to Claim 12 wherein said manifold comprises one or more features for diffusing gas introduced into said manifold.

14. An apparatus according to Claim 11 comprising a porous element between said manifold and said chamber.

15. An apparatus according to Claim 9 wherein said gas outlet comprises a mechanism for controlling the exit flow of said second gas.

16. An apparatus according to Claim 2 wherein said top element comprises glass.

17. An apparatus according to Claim 6 wherein said device for dispensing reagents is selected from the group consisting of print heads and print nozzles.

18. An apparatus according to Claim 6 comprising a device for dispensing reagents for synthesizing an array of chemical compounds on a support wherein at least a portion of said device is within said chamber.

19. An apparatus according to Claim 18 herein said reagents are reagents for synthesizing an array of biopolymers on said support.

20. An apparatus according to Claim 2 wherein said top element comprises a mechanism for introducing a gas into a gap between said top element and said bottom element and said bottom element comprises a support and a holder for said support.

21. An apparatus for manufacturing a plurality of biopolymers on a support in the form of an array, comprising:

(a) a top element having sealingly affixed therein at least a portion of a device for dispensing reagents for synthesizing said biopolymers on a surface of said support,

(b) a bottom element adapted for introduction of a said support therethrough wherein a surface of said support comprises discrete sites that are activated for reaction with said reagents,

(c) a mechanism for introducing a gas to form a movable aerodynamic seal between said top element and said bottom element thereby forming a chamber having a controllable interior environment, and

(d) a platform to which said support is releasably attached for moving said surface of said support relative to said dispensing device and said bottom element relative to said top element.

22. An apparatus according to Claim 21 wherein said mechanism is adapted to introduce said gas adjacent the perimeter of said bottom element.

23. An apparatus according to Claim 21 comprising a bottom wall and side walls wherein said mechanism for introducing a gas comprises openings in said side walls and a source of said gas.

24. An apparatus according to Claim 21 wherein said gas is introduced into at a pressure of about 20 to about 50 psi.

25. An apparatus according to Claim 21 wherein said gas is introduced into a gap between said top element and said bottom element.

26. An apparatus according to Claim 21 wherein said platform comprises a theta stage moved by an x,y linear stage.

27. An apparatus according to Claim 21 comprising a gas inlet for introducing a second gas into the interior of said chamber and a gas outlet for exiting said second gas from said chamber.

28. An apparatus according to Claim 27 wherein the flow of said second gas through the interior of said chamber is substantially uniform.

29. An apparatus according to Claim 28 comprising a mechanism for dispersing said second gas within the interior of said chamber.

30. An apparatus according to Claim 21 wherein said mechanism comprises one or more gas inlets and a manifold comprising one or more compartments, each of said compartments being in fluid communication with a respective gas inlet.

31. An apparatus according to Claim 30 wherein said manifold comprises one or more features for diffusing gas introduced into said manifold.

32. An apparatus according to Claim 30 comprising a porous element between said manifold and said chamber.

33. An apparatus according to Claim 27 wherein said gas outlet comprises an exit door or an exit nozzle.

34. An apparatus according to Claim 21 wherein said top element comprises glass.

35. An apparatus according to Claim 21 wherein said device for dispensing reagents is selected from the group consisting of print heads and print nozzles.

36. An apparatus according to Claim 21 comprising a device for dispensing reagents for synthesizing an array of biopolymer features on a support wherein at least a portion of said device is within said chamber.

37. An apparatus according to Claim 36 wherein said reagents are reagents for synthesizing an array of oligonucleotides on said support.

38. A method for forming a chamber having a controllable interior environment for preparing an array of biopolymers on the surface of a support, said method comprising:

(a) disposing a separate top element and a separate bottom element relative to one another to form a gap therebetween, and

(b) introducing a gas into said gap, the pressure of said gas being sufficient to form a movable aerodynamic seal between said top element and said bottom element thereby forming said chamber.

39. A method according to Claim 38 wherein said gas is introduced adjacent the perimeter of said top element and the perimeter of said bottom element.

40. A method according to Claim 38 wherein said bottom element comprises side walls and said gas is introduced through openings in said side walls of said bottom element.

41. A method according to Claim 40 wherein said gas is introduced into at a pressure of about 20 to about 50 psi.

42. A method according to Claim 40 comprising introducing a second gas into the interior of said chamber after step (b).

43. A method according to Claim 42 wherein the flow of said second gas through the interior of said chamber is substantially uniform.

44. A method according to Claim 42 wherein the flow of said second gas within the interior of said chamber is dispersed.

45. A method according to Claim 42 wherein the flow of said second gas is as it enters said chamber.

46. A method according to Claim 42 wherein said second gas is selected from the group consisting of nitrogen, argon, neon and helium.

47. A method according to Claim 38 wherein said gas is introduced into the interior of said chamber and flows outwardly therefrom through said gap.

48. A method for synthesizing an array of biopolymers on a support, said method comprising:

(a) forming a reaction chamber by disposing two elements relative to one another in a sealed, movable relationship,

(b) bringing said support within said reaction chamber to perform a step in the synthesis of said array on said support wherein said support and one of said elements is moved relative to the other of said elements,

(c) removing said support from said reaction chamber, and

(d) optionally repeating steps (b) through (d) until said biopolymer is formed.

49. A method according to Claim 48 wherein said reaction chamber is formed by disposing two elements relative to one another to form a gap therebetween, and introducing a gas into said gap to form a sealed reaction chamber comprising said two elements,

50. A method for synthesizing an array of biopolymers on a support, said method comprising:

(a) forming a reaction chamber by disposing a separate top element and a separate bottom element relative to one another to form a gap therebetween, said a top element having sealingly affixed therein at least a portion of a device for dispensing reagents, said bottom element being adapted for introduction of a support therethrough, and introducing a gas into said gap, the pressure of said gas being sufficient to form a movable aerodynamic seal between said top element and said bottom element thereby forming said chamber,

(b) introducing said support into said reaction chamber, said support being activated,

(c) bringing said support and a dispensing system for dispensing reagents for the synthesis of said biopolymers into a dispensing position relative to discrete sites on said activated surface of said support by moving said support and said bottom element relative to said top element,

(c) dispensing said reagents to said discrete sites,

(d) removing said support and/or said dispensing system from said relative dispensing position, and

(e) optionally repeating steps (b) through (d) until said biopolymer is formed.

51. A method according to Claim 50 wherein said gas is introduced adjacent the perimeter of said top element and the perimeter of said bottom element.

52. A method according to Claim 50 wherein said gas is introduced through openings in side walls of said bottom element.

53. A method according to Claim 50 wherein said gas is introduced into at a pressure of about 20 to about 50 psi.

54. A method according to Claim 50 comprising introducing a second gas into the interior of said chamber after step (b).

55. A method according to Claim 54 wherein the flow of said second gas through the interior of said chamber is substantially uniform.

56. A method according to Claim 54 wherein the flow of said second gas within the interior of said chamber is dispersed.

57. A method according to Claim 54 wherein said second gas is selected from the group consisting of nitrogen, argon, neon and helium.

58. A method according to Claim 50 wherein said reagents are monomer addition reagents.

59. A method according to Claim 50 wherein an array of said biopolymers is synthesized on said support.

60. A method according to Claim 50 wherein said biopolymers are polynucleotides or polypeptides.

61. A method according to Claim 50 wherein said biopolymers are synthesized on said surface in multiple arrays and said support is subsequently diced into individual arrays of biopolymers on a support.

62. A method according to Claim 50 for synthesizing an array of biopolymers on a surface of a support, said method comprising adding one or more polymer subunits at each of multiple feature locations on said support during each of multiple rounds of subunit additions wherein each round of subunit additions comprises:

(a) introducing said support into said reaction chamber,

(b) bringing said support and a dispensing system for dispensing said polymer subunits for the synthesis of said biopolymers into a dispensing position relative to said activated discrete sites on said surface,

(c) dispensing said polymer subunits to said discrete sites, and

(d) removing said support and/or said dispensing system from said relative dispensing position.

63. A method according to Claim 50 wherein said biopolymers are synthesized on said surface in multiple arrays and said support is subsequently diced into individual arrays of biopolymers on a support.

64. A method according to claim 50 further comprising exposing the array to a sample and reading the array.

65. A method according to claim 64 comprising forwarding data representing a result obtained from a reading of the array.

66. A method according to claim 65 wherein the data is transmitted to a remote location.

67. A method according to claim 64 comprising receiving data representing a result of an interrogation obtained by the reading of the array.

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